Lagoon

Wetland cells

Discharge point at South Platte River

Platteville Facility Statistics	
Nearest Town:	Platteville
County:	Weld
River Basin:	Middle South Platte
Receiving Water Body:	South Platte River
Year Online:	1992
Population:	2500
Elevation (feet):	5100
Design Flow (mgd):	0.348
Average Flow (mgd):	0.13
Size (acres):	3

Facility Description

The Platteville waster treatment facility is a domestic minor municipal lagoon system. The system consists of an aerated lagoon, a settling lagoon and two surface flow constructed wetland cells, followed by chlorine disinfection.

Background Information

Platteville converted a portion of their third lagoon to a constructed wetland to eliminate effluent quality problems resulting from excessive algae growth in the polishing pond. Platteville received a notice of significant noncompliance in July of 1997 for exceeding BOD5 limitations. These violations were considered to be the result of various problems with the aeration equipment.

Energy Analysis

Energy in the system is used to aerate the lagoon. Typical energy expenditures are $500 per month.

Wetland Design

Design Methods

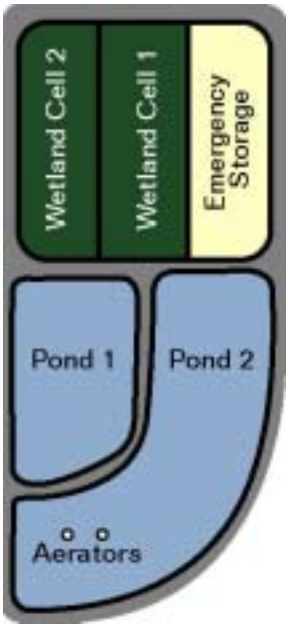
The plug-flow first order kinetics equation was used. The design water elevations were a minimum depth of 6” and a maximum depth of 2’. Detention times of 6 days for summer operations and 1.6 days for winter operations were determined to be sufficient for suspended solids removal.

Objectives

The shallow lagoons at this site produce excessive amounts of algae during summer months. This algal carryover results in high TSS and BOD in the lagoon effluent. The primary objective of the wetland system was the removal of TSS from the lagoon effluent. An influent BOD5 of 40 mg/l was determined to be the average value that the wetlands will see from the lagoon system.

Size

This system was sized to accommodate an average daily flow of 0.348 mgd. The wetland consists of 2 cells, with a total surface area of 3 acres.



Shape

An abandoned lagoon was retrofit to accommodate the wetland cells. As a result, the wetlands are rectangular with a direct flow path.

Hydraulics

Lagoon effluent enters the two parallel wetland cells by a perforated irrigation pipe. A splitter box is located prior to the wetland cells and provides for the bypass of the wetland system. Wastewater flows by gravity towards the outlet end of the wetland cells. An 8” perforated collection pipe is oriented along the width of the wetland cell. Flow is directed through the collection pipe to a flow control structure. The water level in the wetland can be adjusted in the flow control structure by the use of moveable weir plates.

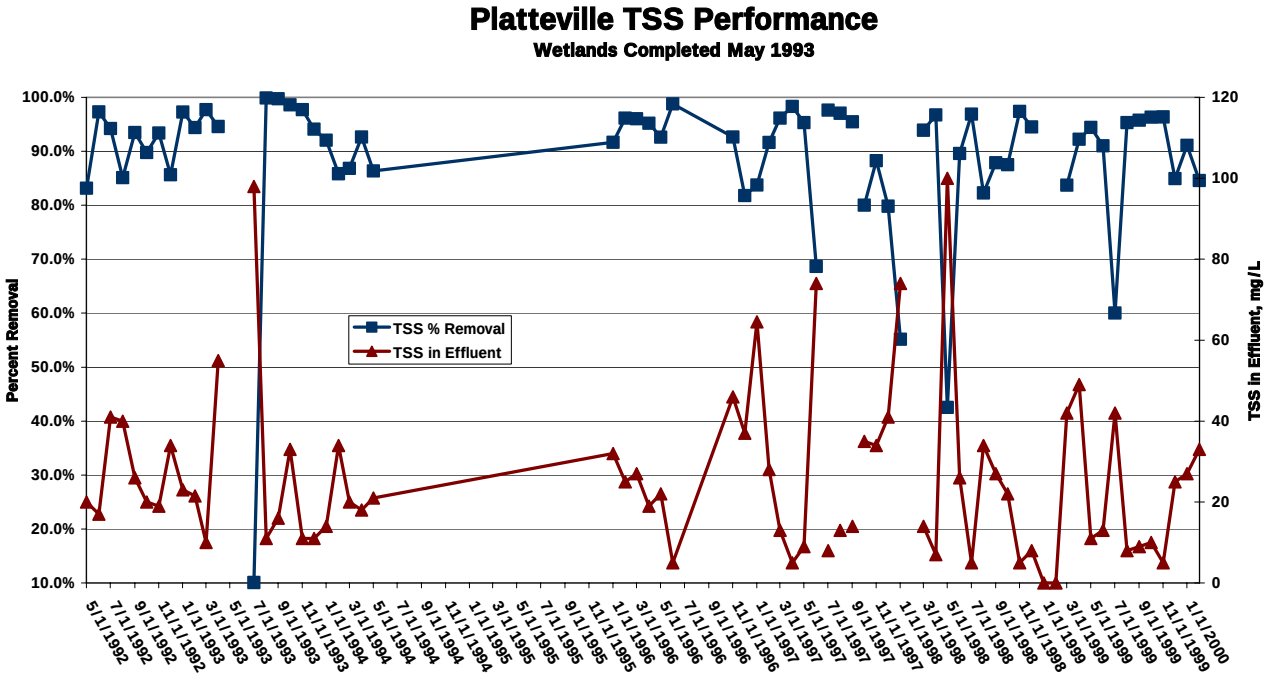
Treatment Goals

Permitted Discharge Limitations	
Oil and Grease:	**10 mg/l (Daily Max)**
BOD_5:	**25 mg/l (30-day ave)**
BOD_5 Removal:	**85%**
TSS:	**75 mg/l (30-day ave)**
PH, su (min – max)	**6.5 – 9.0 (Daily Max)**
Chlorine Residual:	**0.5 mg/l (Daily Max)**
Fecal Coliform Bacteria:	**6,000 organisms per 100 ml (Daily Max)**

Water Quality Data

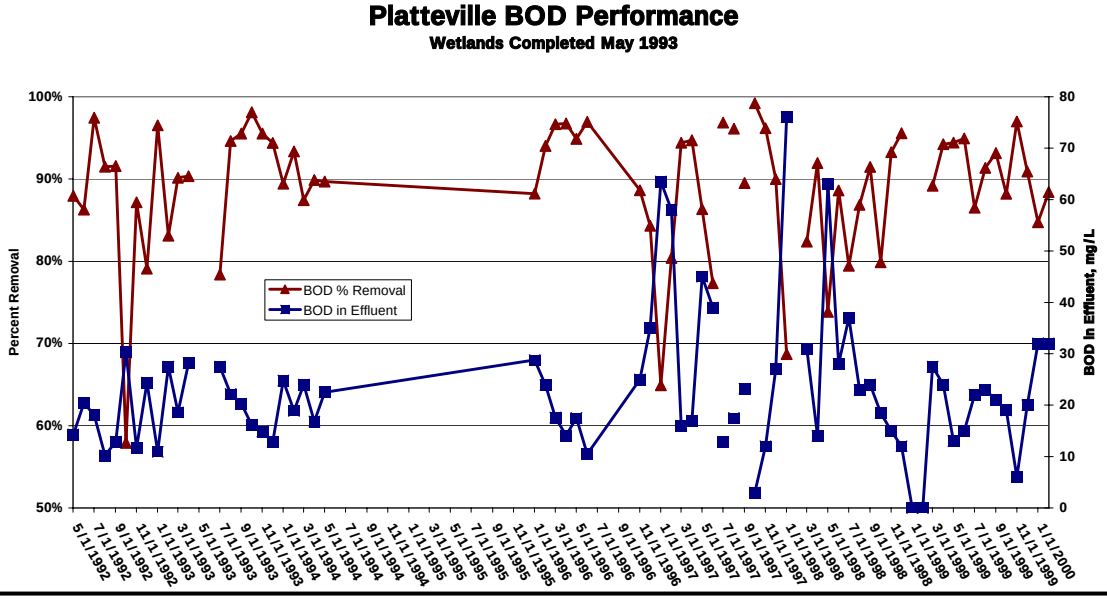
TSS Data

The TSS graph plots the percent removal on the left axis and TSS in mg/l in the effluent on the right axis. The average monthly TSS in the influent, over the period of record, has been 271 mg/l and the average monthly effluent has been 30 mg/l. This meets the permit discharge requirement of 75 mg/l.



BOD Data

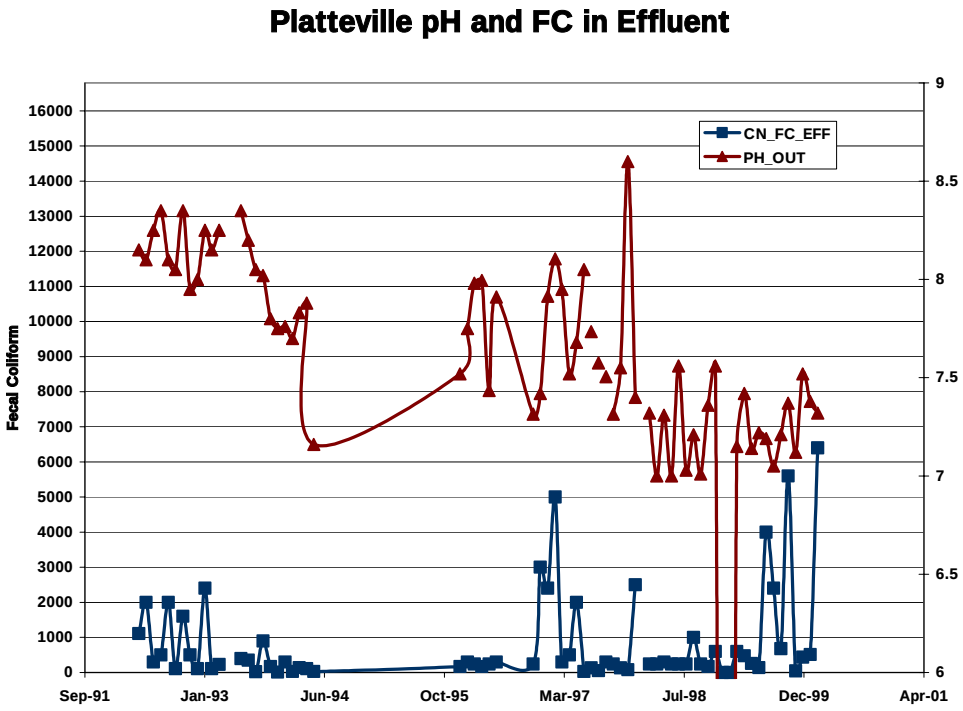
The BOD data is plotted similarly to the TSS data, with mg/l in the effluent on the right axis, and percent removal on the left axis. The average monthly influent amount has been 272 mg/l and the average monthly effluent amount has been 26 mg/l



pH and Fecal Coliform

Data for these two categories has been plotted on the same graph. Data reflect the quality of the effluent; no influent measurements are taken for these parameters. The pH values plotted are an average of the minimum and maximum 30-day values that are reported in the monthly reports. Over the period of record, pH values have consistently stayed within the allowable range of 6.5 to 9.

The average fecal coliform level has been 1009 organisms per 100 ml. This meet the discharge permit requirements of 6,000 organisms per 100 ml.



General Ecological Setting

The Platteville wetland is a flat, rectangular basin situated on the northern side of Platteville, adjacent to farmland. The site is in an upland area about 3 miles east of the South Platte River.

Cell Vegetation

The Platteville treatment wetland consists of one cell with a single vegetation community. The cell, which is approximately 1.8 acres, is dominated by cattails (97 percent—*Typha latifolia*) and lady's thumb (3 percent—*Polygonum persicaria*) with trace amounts of softstem bulrush (*Scirpus tabernamontanae*), curly dock (*Rumex crispus*), and duckweed (*Lemna minor*).

Planting/Seeding

There were no records of the planting or seeding plans for this wetland.

Weeds

Canada thistle and cheatgrass are present in small amounts in the Platteville constructed wetland. Both species are State Noxious Weeds. They are invasive in areas of recent disturbance, spread quickly, prevent the establishment of native species, and have low value as wildlife habitat.

Maintenance Issues

No maintenance issues related to vegetation health were noted.

Wildlife

The constructed wetland at Platteville provides habitat for songbirds. Red winged blackbirds and barn swallows were observed at the site visit. This wetland is not structurally diverse , and probably is of limited value to wildlife. Red winged black birds probably nest in the wetland, but the wetland does not provide unique, diverse habitat for wildlife.

Wetland Biodiversity Functional Assessment

Sediment/nutrient/toxicant removal rated high. Production export/food chain support rated moderate. All other parameters measured low. This wetland received 33 percent of the total possible functional points, and was functionally rated as a category IV wetland.

Wetland Biodiversity Functional Assessment.

Function and Value Variables	Functional Points (0.1 to 1)	Possible Points
General Wildlife Habitat	0.1 (low)	1
General Fish / Aquatic Habitat	0.0	1
Production Export / Food Chain Support	0.6 (mod.)	1
Habitat Diversity	0.1 (low)	1
Uniqueness	0.2 (low)	1
Total Points	2.0 (40%)	5
Wetland Category (I, II, III, or IV)	IV	

Human Use

The wastewater wetland is part of a restricted public access area, and has never been used for educational purposes. This wetland has moderate aesthetic value. The wetland is comprised mainly of a uniform stand of cattail.

Overall Site Comments

This treatment wetland supports healthy vegetation, and no maintenance problems were noted. At the time of the site visit, however, it was not discharging into the South Platte River. The wetland system appeared to

be healthy and operating as designed. However, the primary treatment lagoon system was not operating as intended, which resulted in excessive loading to the wetland system and difficulty in meeting permit limitations.